foreground information and (iv) to encode those 8 x 8 DCT blocks having at least the particular amount of foreground pixel information at a first higher level of quantization and those 8 x 8 DCT blocks having less than the particular amount of foreground pixel information at a second lower level of quantization.

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REMARKS

Applicants have carefully reviewed the above-identified application in light of the Office Action dated March 14, 2001. Claims 1-16 are pending in the application. Claim 1, 4, 7, 8, 11, and 14 -16 are independent claims. Applicants respectfully request reconsideration. Claims 12 and 14-16 were amended to correct informalities and the improper form objected to by the Examiner.

Claims 1-16 were rejected under 35 U.S.C. 103(a) as being unpatentable over Stenger of record (DE 3608489A1) in view of U.S. Patent 5,815,601 (hereinafter "Katata"). Claim 16 was rejected under 35 U.S.C. 112, second paragraph, as being indefinite. Although Applicants believe claim 16 is not indefinite, it has been amended as suggested by the Examiner to expedite allowance.

In regard to the pending claims, Applicants respectfully submit the following comments.

Claim 1 is directed to an image processing device that receives a stereo pair of images, a foreground extractor which compares location of like pixel information in each image to determine which pixel information is foreground pixel information and which pixel information is background pixel information, a DCT block classifier which determines which DCT blocks of at least one of the images contain a threshold amount of foreground information, and an encoder which encodes the DCT blocks having the threshold amount of foreground information with a first level of quantization and which encodes the DCT blocks having less than the threshold amount of foreground information at a second lower quantization level. Independent claims 4, 7, 8, 11, and 14 -16 recite similar limitations with regard to a methods, systems and an apparatuses.

As understood by Applicants, Stenger, relates to using a stereo pair of cameras to image the video conference participant. A comparison is then made of the two images and using various displacement techniques the contour of the foreground information is located. Once the contour of the foreground information is located, the background information is also known. A single static background image is then transmitted to a receiver to be stored in memory. The foreground images are encoded and transmitted along with address data which define where in the background image the foreground images should be placed.

As indicated by the Examiner, starting on page 4 paragraph 2 of the Office Action, Stenger does not teach (a) a DCT block classifier which determines which DCT blocks of at least one of the images contain a threshold amount of foreground information, and an encoder which encodes the DCT blocks having the threshold amount of foreground information with a first level of quantization and which encodes the DCT blocks having less than the threshold amount of foreground information at a second lower quantization level, as claimed in claims 1, 4, 7, 8, 11, 12 and 14-16; or (b) wherein the foreground pixel informaiton is defined in terms of entire 8X8 blocks of DCT coeffiicients... as claimed in claims 6 and 10.

As understood by Applicants, Katata, relates to an image encoder for encoding the image data so as to make the image quality of a selected area better than that of the other areas without increasing the amount of data. The image encoder divides the imput image data into blocks and encodes the data block by block, which comprises an area selecting means for selecting an area whose image quality should be improved, an area position and shape encoding means for encoding the postiion data and shape data of the area, and a parameter adjusting means for adjusting coding parameters. See col. 2, lines 10-20.

Thus, the addition of Katata does not provide the missing teachings of Stenger, since Katata does not teach the use of a DCT

block classifier or the threshold amounts of foreground information with a first and second level, as defined in claim 1. Moreover, it is not seen how such a combination would be possible and the Office Actions fails to identify any teaching or suggestion in Stenger or Katata for integrating such elements, as recited in Claim 1.

In the seminal case of Winner International Royalty Corp. v. Wang, 48 USPQ.2d 1139, the court held:

> ". . . invention cannot be found obvious unless there was some explicit teaching or suggestion in art to motivate one of ordinary skill to combine elements so as to create same invention." [at 1140] [emphasis added] The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification.

In re Fritch, 972 F.2d 1260, 1266, 23 USPQ 2d 1780, 1783-84 (Fed. Cir. 1992)

Moreover, the Court of Appeals for the Federal Circuit has stated that:

> The examiner must show reasons that the skilled artisan, confronted with the same problems as the inventor and with no knowledge of the claimed invention, would select the elements from the cited prior art references for combination in the manner claimed.

In Re Denis Rouffet, 47 USPQ.2d 1453, 1457-58 (Fed. Cir. 1998) (emphasis added).

Accordingly, Applicants submit that the Office Action fails to make a prima facie case conclusion of obviousness. Withdrawal of the rejection is respectfully requested.

Withdrawal of the rejection of dependent Claims 2-4 and 6-9 is requested for the same reasons discussed above in regard to Stenger and Katata.

In view of the foregoing remarks, Applicants respectfully requests favorable reconsideration and early passage to issue of the present application.

Respectfully submitted,

By _____
Daniel J. Piotrowski, Reg. 42,079
Attorney
(914) 333-9624

CERTIFICATE OF MAILING

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On June 11, 2001

By Noemi Chapa

VERSION WITH MARKING TO SHOW CHANGES MADE

IN THE CLAIMS

Please amend the claims as follows:

1. An image processing device, comprising:

an input which receives a stereo pair of images;

a foreground extractor coupled to the input which compares location of like pixel information in each image to determine which pixel information is foreground pixel information and which pixel information is background pixel information;

a DCT block classifier coupled to the foreground extractor which determines which DCT blocks of at least one of the images contain a threshold amount of foreground information; and

an encoder coupled to the DCT block classifier which encodes the DCT blocks having the threshold amount of foreground information with a first level of quantization and which encodes the DCT blocks having less than the threshold amount of foreground information at a second lower quantization level.

2. The image processing device as claimed in claim 1, wherein the stereo pair of images are received from a stereo pair of cameras spaced closely from one another in a video conference system.

3. The image processing device as claimed in claim 1, wherein the foreground extractor computes the difference in location of like pixels in each image and selects the foreground pixels as those pixels whose difference in location falls above a threshold distance.

4. An image processing device, comprising:

an input which receives a stereo pair of images;

a foreground extractor which detects foreground pixel information from the stereo pair of images; and

an encoder coupled to the foreground extractor which encodes the foreground pixel information at a first high level of quantization and which encodes background pixel information at a second lower level of quantization.

5. The image processing device as claimed in claim 4, wherein the foreground extractor computes the difference in location of like pixels in each image and selects the foreground pixels as those pixels whose difference in location falls above a threshold distance.

6. The image processing device as claimed in claim 4, wherein the foreground pixel information is defined in terms of entire 8 x 8

blocks of DCT coefficients.

7. An image processing system, comprising:

a stereo pair of cameras for taking a stereo pair of images;

a foreground extractor which detects foreground pixel information from the stereo pair of images; and

an encoder coupled to the foreground extractor which encodes the foreground pixel information at a first high level of quantization and which encodes background pixel information at a second lower level of quantization.

8. A method of encoding a stereo pair of images, comprising:

receiving the stereo pair of images;

extracting foreground information from the stereo pair of images; and

encoding the foreground information at a first higher quantization level and encoding background information of the stereo pair of images at a second lower quantization level.

9. The method in accordance with claim 8, wherein the step of extracting includes the following steps:

identifying the locations of like pixels in each of the stereo pair of images;

calculating the difference between the locations of like pixels; and

determining for each set of like pixels whether the difference between locations falls above a threshold difference, and if so identifying those pixels as foreground information.

10. The method in accordance with claim 8, wherein the encoding step encodes an entire 8 x 8 block of DCT coefficients as foreground information if at least a predetermined number of foreground pixels are within the 8 x 8 block, otherwise the entire 8 x 8 block of DCT coefficients is encoded as background information.

11. Computer-executable process steps to process image data from a stereo pair of images, the computer-executable process steps being stored on a computer-readable medium and comprising:

a foreground extracting step to detect foreground pixel information from the stereo pair of images; and

an encoding step for encoding foreground pixel information of at least one image at a first higher quantization level and for encoding background pixel information of the at least one image at a second lower quantization level.

12. (Amended) The computer-executable process steps as claimed in claim 11, wherein the foreground extracting step determines which 8 x 8 DCT blocks contain at least a predetermined amount of foreground pixel information; and wherein the encoding step encodes ~~the~~ an entire 8 x 8 block of DCT coefficients at the first higher quantization level if the 8 x 8 block of DCT coefficients contains the predetermined amount of foreground pixel information.

13. (Amended) The computer-executable process steps as claimed in claim 11 ~~and~~ or 12, wherein the step of foreground extracting computes the difference in location of like pixels in each image and selects the foreground pixels as those pixels whose difference in location falls above a threshold distance.

14. An apparatus for processing a stereo pair of images, the apparatus comprising:

a memory which stores process steps; and

a processor which executes the process steps stored in the memory so as (i~~i~~) to extract foreground information from the stereo pair of images and (ii) to encode the foreground information at a first high level of quantization and to encode background information at a second low level of quantization.

15. An apparatus for processing a stereo pair of images, the apparatus comprising:

a memory which stores process steps; and

a processor which executes the process steps stored in the memory so as (i~~i~~) to extract foreground information form the stereo pair of images in the fro~~m~~m of foreground 8 x 8 DCT blocks of coefficients, and (ii) to encode the foreground 8 x 8 DCT blocks of coefficients at a first high level of quantization and to encode background 8 x 8 DCT blocks of coefficients at a second lower level of quantization.

16. (Amended) An apparatus for processing a stereo pair of images, the apparatus comprising:

a memory which stores process steps; and

a processor which executes the process steps stored in memory so as (i~~i~~) to calculate the difference in location of like pixels in each image, (ii) if the difference in location is above a set threshold the pixel information is identified as foreground pixel information, if below the set threshold the pixel information is determined to be background pixel information, (iii) to determine whether each 8 x 8 DCT block contains a particular amount of foreground information and (iv) to encode those 8 x 8 DCT blocks having at least the particular amount of foreground pixel

information at a first higher level of quantization and those 8 x 8 DCT blocks having less than the particular amount of foreground pixel information at a second lower level of quantization.